**Algebra I Name:**

**Mr. Stiff Period:**

**PRACTICE FINAL EXAM, 2017-18 Date:**

**Part 1: Algebraic Writing: Use complete sentences to answer the questions below.**

* 1. A friend tells you that the relationship between the height of a sunflower and the number of hours of sunlight it gets is a real-life example of an algebraic function. Do you agree or disagree? To earn full points, you must (1) provide adefinitionof a function, and (2) explain how the situation does or does not fit the definition you have provided.

**Definition of a Function:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**The relationship between the height of a sunflower and the number of hours of sunlight it gets**

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* 1. Explain the main difference between *linear* functions and *exponential* functions.

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* 1. What is the **solution** to a system of linear equations? Draw a picture and give a written explanation.

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**Part 2: Algebraic Vocabulary**

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| * 1. Label the **variable, coefficient, term, expression, base**, and **exponent.** |
| **The whole thing:** |

**Part 3: Simplifying Expressions** Simplify the following expressions *completely*. Show all your work and BOX your final answer.

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**Part 4: Solving Equations** Solve the following equations. BOX your final answer.

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**Part 5: Writing Equations** Write the equation specified by each question. Show all your work and write your final answer in the box provided.

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| * 1. Write a slope-intercept form equation for the line that has a y-intercept of negative five and a slope of two. |
| * 1. Write a slope-intercept form equation for a line that is *parallel* to the line in question number fourteen. |
| * 1. Write a slope-intercept form equation for the line that passes through (6, -4) and (3, 8). |
| * 1. Write a slope-intercept form equation for the line that passes through (8, 4) and is parallel to the line: |
| * 1. Write a slope-intercept form equation for the line that passes through (0, 5) and is perpendicular to the line: |

|  |
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| * 1. Read the following scenario and answer the questions below:   *Yao and Johnny both win a portion of the lottery and have a choice of how they want to be paid. Yao decides to get an initial payment of $5,000 and be paid $50 each day for a month. Johnny decides to take an initial payment of $1 and have her money doubled each day for a month.*   1. **Fill in the blank.** One of these options is an example of *linear* growth; the other is an example of *exponential* growth. Which one is which?   Yao’s choice is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ growth; Johnny’s is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ growth.   1. Write an equation that shows how much money Yao will have received after *x* number of days   **Equation:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   1. Write an equation that shows how money Johnny will have received after *x* number of days   **Equation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**   1. How much total money will Yao have received after 5 days? Show your work and BOX your answer. 2. How much total money will Johnny have received after 5 days? Show your work and BOX your answer. 3. If you were only going to be paid for twenty days, would you choose the option Yao chose or the option Johnny chose? To earn full points, you must **explain why**.   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

**Part 6: Functions**

* 1. Are the following input-output representations **functions**? Please **circle** the correct choice.

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| **Input** | 4 | 2 | -5 | 9 |
| **Output** | 7 | 1 | 4 | 0 |

**Function**

**Not a function**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **x** | 3 | 2 | 0 | 3 | 4 |
| **y** | -8 | 1 | 6 | 5 | 10 |

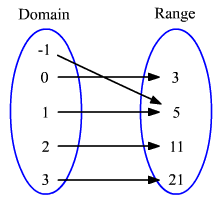
**Function**

**Not a function**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **x** | -2 | 0 | 2 | 5 | 7 |
| **f(x)** | 11 | 5 | -3 | 3 | 5 |

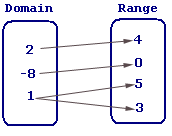
**Function**

**Not a function**

1. 

**Function**

**Not a function**

1. 

**Function**

**Not a function**

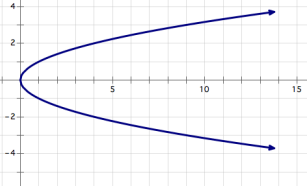
**Function**

**Not a function**

1. **{ (1, 6) (2, 3) (5, 7) (1, 10) }**

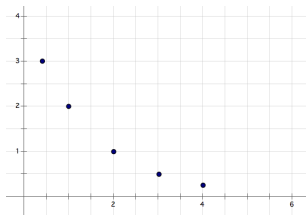
**Function**

**Not a function**

1. **{ (-7, 1) (-5, 3) (1, 9) (2, 11) }**
2. 

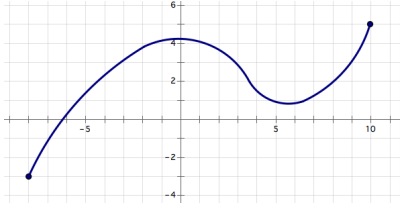
**Function**

**Not a function**



**Function**

**Not a function**



**Function**

**Not a function**

**Part 7: Graphing and Naming Linear Equations**

* 1. Graph the following linear equations.

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|  | |  |  | | --- | --- | | **x-intercept: (\_\_\_, \_\_\_\_)** | **y-intercept: (\_\_\_, \_\_\_\_)** | |  |  | |

* 1. Write the slope-intercept form of the equation for the following lines.

|  |  |
| --- | --- |
| **Equation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | **Equation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |
| **Equation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | **Equation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |

**Part 8: Systems of Linear Equations** Solve each system **using the method of your choice**. Write your answer as a coordinate (if possible) in the box provided. *Tip: Check your work using substitution!*

|  |
| --- |
| * 1. Suggestion for solving (not required): Solve by GRAPHING: and   C:\Users\John\Downloads\graph_20150517_053126.png **SOLUTION: ( \_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_ )** |
| * 1. Suggestion for solving (not required): Solve by SUBSTITUTION:   **SOLUTION: ( \_\_\_\_\_\_\_\_ , \_\_\_\_\_\_\_\_\_ )** |
| * 1. Suggestion for solving (not required): Solving by ELIMINATION:   **SOLUTION: ( \_\_\_\_\_\_\_\_ , \_\_\_\_\_\_\_\_ )** |

**Part 9: Exponential Simplification** Simplify *completely*. No negative exponents, no like bases.

1. Evaluate:
2. Evaluate:
3. Evaluate:
4. Write with positive exponents:
5. Write with positive exponents:
6. Write with positive exponents:
7. Write with positive exponents:
8. Write with positive exponents:
9. Simplify:
10. Simplify:
11. Simplify:
12. Simplify
13. Simplify

**Part 10: Writing and Naming Polynomials:** Write each polynomial in simplified, standard form. Then, name the polynomial by degree and by term.

|  |  |  |
| --- | --- | --- |
| Standard Form: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Standard Form: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Standard Form: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

**Part 11: Factoring and Distributing Polynomials**Please factor **completely.**

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| --- |
| * 1. Factor completely: |
| * 1. Distribute to write in standard form: |

**Part 12: Multiple Choice**

|  |  |
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| * 1. Which ordered pair is the solution of the following system of equations?   3x + 2y =4  -2x +2y =24   1. (2,-1) 2. (2,-5) 3. (-4,8) 4. (-4,-8) | * 1. If a system of equations has **no** solution, what does the graph look like?  1. intersecting lines 2. parallel lines 3. skew lines 4. same line |
|  | A.  B.  C.  D. |
| * 1. Which of the following equations matches this input-output table?  |  |  | | --- | --- | | ***x*** | ***y*** | | **0** | **1.5** | | **1** | **4.5** | | **2** | **13.5** | | **3** | **40.5** | | **4** | **121.5** | |  |
| * 1. How many solutions does the following system have?   http://www.mathsisfun.com/algebra/images/linear-quadratic-c.gif | 1. No solution 2. One solution 3. Two solutions 4. Five solutions 5. Infinite solutions |

**Part 13: Exponential Growth and Decay**

Determine whether the following situation, table and pattern represents an exponential or linear pattern. Then write the equation. (3 points each)

1. A postal worker has $1,000 in his savings account. He is able to add $200 to his account each week.

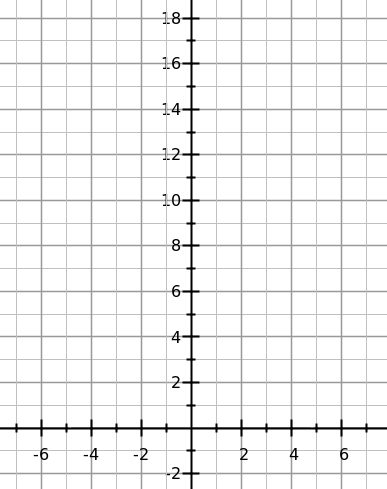
**Circle One:** Linear or Exponential? **Equation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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| --- | --- | --- | --- | --- | --- |
| *x* | 0 | 1 | 2 | 3 | 4 |
| *y* | 2 | 6 | 18 | 54 | 162 |

**Circle One:** Linear or Exponential? **Equation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

|  |  |  |  |
| --- | --- | --- | --- |
| **Step 0** | **Step 1** | **Step 2** | **Step 3** |
|  |  |  |  |

**Circle One:** Linear or Exponential? **Equation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**



1. Complete the input-output table and graph:

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| --- | --- |
|  |  |
| **-3** |  |
| **-2** |  |
| **-1** |  |
| **0** |  |
| **1** |  |
| **2** |  |
| **3** |  |

**Equation:**

1. At the start of 2010 there were 450 deer in Rock Creek Park. Since then, the number of deer has grown by 2% each month. How many deer were there at the start of 2012?
2. You bought your first car 5 years ago for $26,550. Since then, the value of the car has depreciated by 5% each year. How much is the car worth now?
3. You invested $10,000 in an account that pays 2.4% APR compounded quarterly. How much money will you have in the account in 5 years?